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ABSTRACT

Research which resulted in the development of the Specific Aptitude Test Battery for use in selecting inexperienced or untrained individuals for training as Licensed Practical Nurses is described. Occupational norms were established in terms of minimum qualifying scores for each significant aptitude measure, which when combined, predict job performance. Statistical data, names of hospitals participating in the study, and supervisor's rating scales are included. (DE)

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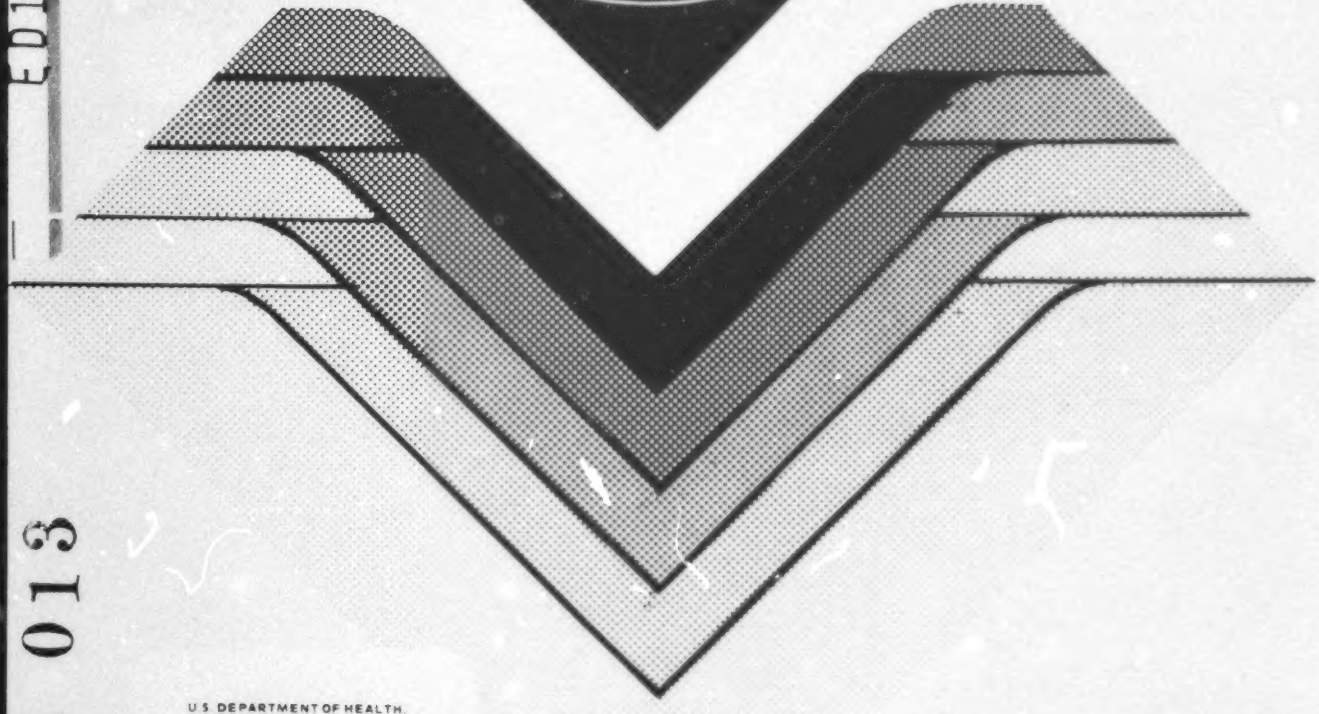
Development of USES Aptitude Test Battery for Nurse, Licensed, Practical (medical service) 079.378

U.S. Department of Labor
Manpower Administration
U.S. Employment Service
Technical Report S-270R75
1975

ED117159



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Technical Report on Development of USES Specific Aptitude Test Battery

For

Nurse, Licensed Practical (medical ser.) 079.378

S-270R75

Developed in Cooperation with the
Alabama, Colorado, Connecticut, Georgia, Illinois, Indiana, Louisiana, Massachusetts, Minnesota, Nevada, New York, North Carolina, Oklahoma, Oregon, Pennsylvania, Rhode Island, Texas, West Virginia and Wisconsin State Employment Services

U. S. DEPARTMENT OF LABOR
John T. Dunlop, Secretary

Manpower Administration
William H. Kolberg
Assistant Secretary for Manpower

1975

Development of USES Specific Aptitude Test Battery S-270R75

For

Nurse, Licensed Practical (medical ser.) 079.378

RESEARCH SUMMARY

This report describes the research which resulted in the development of the following Specific Aptitude Test Battery for use in selecting inexperienced or untrained individuals for training as Licensed Practical Nurses:

Aptitudes	Cutting Scores
V - Verbal Aptitude	75
Q - Clerical Perception	80
K - Motor Coordination	90
M - Manual Dexterity	85

Sample:
204 Licensed Practical Nurses (201 females and 3 males) employed in the North, South and West (see Appendix 2). A total of 85 were minority group members (73 Blacks, 8 Spanish Surnamed, 1 Aleut, 2 French Canadians and 1 Filipino) and 119 were nonminority group members.

Criterion:
Supervisory ratings. Criterion data were collected during 1973 and 1974.

Design:
Concurrent (test and criterion data were collected at about the same time).

Validity:
Phi coefficient for total sample = .27 ($P/2 < .0005$)
Phi coefficient for the Black subsample = .26 ($P/2 < .05$)
Phi coefficient for nonminority subsample = .24 ($P/2 < .005$)

Comparison of Minority and Nonminority Groups:
No differential validity was found for this battery.

The difference between the phi coefficients for Black and nonminority groups is not statistically significant (CR = .11). The battery is fair to Blacks since the percent who met the cutting scores approximated the percent who were in the high criterion group; 67% met the cutting scores and 62% were in the high criterion group.

JOB ANALYSIS

Job analysis was performed by observation of the workers' performance on the job and in consultation with the workers' supervisors. On the basis of the job analysis, the job description shown in Appendix 4 was prepared. The job description was used to (1) select experimental samples of workers who were performing the job duties; (2) choose appropriate criteria or measures of job performance; (3) determine which aptitudes are critical, important or irrelevant to job performance (see Tables 1 and 4); and (4) provide information on the applicability of the test battery resulting from this research.

TABLE 1

Qualitative Analysis

Aptitude	Rationale
G - General Learning Ability	Required to learn, understand and apply nursing procedure and hospital routine, to carry out physicians' instructions effectively, and to make accurate judgements concerning patient's care.
V - Verbal Aptitude	Required to understand oral and written instructions and to communicate effectively with patients and medical personnel.
Q - Clerical Perception	Required to observe and record accurately patient's condition, dosages, fluid intake and output and other pertinent information on charts and forms.
K - Motor Coordination	Required to provide surgical instruments requested by physician rapidly and to assist in emergency care to patients.
M - Manual Dexterity	Required to handle and manipulate medical and surgical instruments and supplies, to prepare and apply dressings, compresses and packs, to take blood pressure, and to assist in the administration of oxygen, glucose, blood or blood plasma.

EXPERIMENTAL TEST BATTERY

All 12 tests of the GATB, B-1002B, were administered.

CRITERION

The immediate supervisor rated each worker. The ratings were obtained by means of personal visits of State test development analysts who explained the rating procedure to the supervisors. Two ratings were obtained from each supervisor with an interval of at least two weeks between the ratings. Since sample members' test scores are confidential, supervisors had no knowledge of the test scores of workers.

A descriptive rating scale was used. The scale (see Appendix 3) consists of six items. Five of these items cover different aspects of job performance. The sixth item is a global item on the Licensed Practical Nurse's "all-around" ability. Each item has five alternative responses corresponding to different degrees of job proficiency. For the purpose of scoring the items, weights of 1 to 5 were assigned to the responses. The total score on the rating scale is the sum of the weights for the six items. The possible range for each rating is 6-30.

A review of the job description indicated that the subjects covered by the rating scale were directly related to important aspects of job performance.

A - Quantity of work: Licensed Practical Nurse must work quickly and efficiently in providing patient care so that all patients needing care will receive timely attention.

B - Quality of work: Licensed Practical Nurse's work must be of high quality to provide optimum health care and to avoid potential dangers of improper treatment.

C - Accuracy of work: Licensed Practical Nurse must provide exact dosages of medicine and observe vital signs (pulse, temperature, blood pressure, etc.) accurately.

D - Job knowledge: Licensed Practical Nurse must have sufficient knowledge of nursing procedures to provide appropriate health care and to recognize when assistance of professional nurse or physician is required.

E - Job versatility: Licensed Practical Nurse must be able to perform a variety of different job duties such as care to bed patients, preparation of patients for surgery, home care, care of newborn infants, and assistance in emergency care.

F - "All-around" job ability: Licensed Practical Nurse's value to the health care provider involves a combination of aspects of job performance listed above.

A reliability coefficient of .81 was obtained between the initial ratings and the reratings, indicating a significant relationship. Therefore, the final criterion score consists of the combined scores of the two ratings. The possible range for the final criterion is 12-60. The actual range is 24-60. The mean is 44.7 with a standard deviation of 7.4. The relationship between the criterion and age, education and job experience is shown in Table 2.

TABLE 2

Means, Standard Deviations (SD) and Pearson Product-Moment Correlations with the Criterion (r) for Age, Education and Experience

	Mean	SD	r
Age (years)	35.5	11.1	.028
Education (years)	12.5	1.2	.014
Experience (months on current job)	63.0	56.4	.202**
Total Experience (months)	90.5	71.5	.150*

*Significant at the .05 level
**Significant at the .01 level

About one-third of the workers are considered to be marginal workers. Therefore, the criterion distribution was dichotomized so as to include about one-third of the sample in the low criterion group and the remainder in the high criterion group. The criterion cutting score was set at 43 which places 35% in the low criterion group and 65% in the high criterion group.

SAMPLE

The sample consisted of 204 Licensed Practical Nurses (201 females and 3 males) employed in the North, South and West (see Appendix 2). A total of 85 were minority group members (73 Blacks and 8 Spanish Surnamed, 1 Aleut, 2 French Canadians and 1 Filipino) and 119 were nonminority group members. The means and standard deviations for age, education and experience of the sample members are shown in Table 2. Licensed Practical Nurses must obtain a State license which involves an examination in virtually all States. All workers had at least 1 month of experience in their current job. Descriptive statistics for subgroups are shown in Appendix 1.

STATISTICAL RESULTS

TABLE 3

Statistical Results for Total Sample

N=204

Aptitude	Mean	SD	r
G - General Learning Ability	94.5	14.2	.194**
V - Verbal Aptitude	98.7	13.6	.168*
N - Numerical Aptitude	93.2	14.8	.070
S - Spatial Aptitude	94.4	15.5	.101
P - Form Perception	102.8	20.2	.113
Q - Clerical Perception	113.0	15.8	.139*
K - Motor Coordination	106.3	16.6	.191**
F - Finger Dexterity	94.3	22.2	.067
M - Manual Dexterity	95.7	21.6	.138*

* Significant at the .05 level
** Significant at the .01 level

Table 4 summarizes the qualitative analysis and statistical results shown in Tables 1 and 3 and shows the aptitudes considered for inclusion in the battery.

TABLE 4

Summary of Qualitative and Quantitative Data for Validation Sample

Type of Evidence	Aptitudes								
	G	V	N	S	P	Q	K	F	M
"Critical" on Basis of Job Analysis									
"Important" on Basis of Job Analysis	X	X				X	X		X
"Irrelevant" on Basis of Job Analysis									
Relatively High Mean					X	X	X		
Relatively Low Standard Deviation	X	X	X						
Significant Correlation with Criterion	X	X				X	X		X
Aptitudes Considered for Inclusion in the Battery	G	V				Q	K		M

The information in Table 4 indicates that the following aptitudes should be considered for inclusion in the battery: G, V, Q, K and M. The objective is to develop a battery of 2, 3 or 4 aptitudes with cutting scores set at five point intervals at the point (a) where about the same percent will meet the cutting scores as the percent placed in the high criterion group and (b) which will maximize the relationship between the battery and the criterion. The cutting scores are set at approximately one standard deviation below the mean aptitude scores of the sample, with deviations above or below these points to achieve the objectives indicated above.

The following battery resulted:

Aptitudes	Cutting Scores
V - Verbal Aptitude	75
Q - Clerical Perception	80
K - Motor Coordination	90
M - Manual Dexterity	35

VALIDITY OF THE BATTERY

TABLE 5
Validity of Battery for Total Sample

	Below Cutting Scores	Meeting Cutting Scores	Total
High Criterion Group	33	99	132
Low Criterion Group	37	35	72
Total	70	134	204

Phi coefficient = .27
Significance level = P/2 < .0005

TABLE 5a
Validity of Battery for Black Subsample

	Below Cutting Scores	Meeting Cutting Scores	Total
High Criterion Group	10	35	45
Low Criterion Group	14	14	28
Total	24	49	73

Phi coefficient = .26 (Yates' corrected)
Significance level = P/2 < .05

TABLE 5b
Validity of Battery for Nonminority Subsample

	Below Cutting Scores	Meeting Cutting Scores	Total
High Criterion Group	22	57	79
Low Criterion Group	21	19	40
Total	43	76	119

Phi coefficient = .24
Significance level = P/2 < .005

OCCUPATIONAL APTITUDE PATTERN

This occupation was incorporated into OAP-57 in Section II of the 1970 edition of the Manual for the USES General Aptitude Test Battery with a double asterisk (**) because the cutting score for Aptitude Q is more than 10 points lower than the cutting score for Aptitude Q in OAP-57 but a significant phi coefficient was obtained between the criterion and the OAP-57 cutting scores of Q-95, K-95 and M-85. A phi coefficient of .21 ($P/2 < .005$) was obtained for the total sample.

APPENDIX 1

Descriptive Statistics for Black and Nonminority Subsamples

	Black (N=73)			Nonminority (N=110)		
Variable	Mean	SD	Range	Mean	SD	Range
Aptitude G	85.7	12.8	58-112	99.5	12.6	74-138
Aptitude V	91.0	11.6	70-127	103.1	12.2	70-133
Aptitude N	85.3	14.9	52-121	97.8	13.0	63-136
Aptitude S	87.7	15.4	58-127	98.4	14.4	74-147
Aptitude P	94.1	19.4	31-128	107.5	18.5	55-153
Aptitude Q	107.5	15.6	72-143	110.2	15.0	75-148
Aptitude K	106.9	17.3	68-144	105.6	16.4	56-146
Aptitude F	91.8	20.2	43-146	95.3	22.9	45-146
Aptitude H	95.0	18.5	44-149	95.2	23.6	24-172
Criterion	44.3	7.6	24-60	44.7	7.3	26-60
Age	35.5	8.9	21-54	35.2	12.2	19-64
Education	12.5	1.5	6-15	12.6	1.1	8-16
Experience (months on current job)	73.9	60.5	3-240	57.0	53.0	1-300

APPENDIX 2

Geographic Distribution of Sample

	Black Subsample	Total Sample
North	27	81
South	41	108
West	5	15
Total	73	204

Organizations Cooperating in the Study

North
Bridgeport Hospital, Bridgeport, Connecticut
New Britain General Hospital, New Britain, Connecticut
Little Company of Mary Hospital, Evergreen Park, Illinois
St. Francis Hospital, Peoria, Illinois
St. Joseph's Hospital, Alton, Illinois
Methodist Hospital, Indianapolis, Indiana
St. Vincent Hospital, Indianapolis, Indiana
Lemuel Shattuck Hospital, Jamaica Plain, Massachusetts
Fairview Hospital, Minneapolis, Minnesota
Albany Memorial Hospital, Albany, New York
Central General Hospital, Plainview, New York
Downstate Medical Center, Brooklyn, New York
Germantown Hospital, Philadelphia, Pennsylvania
Our Lady of Fatima, Providence, Rhode Island
De Paul Rehabilitation Hospital, Milwaukee, Wisconsin
St. Luke's Hospital, Racine, Wisconsin

South
Andalusia Hospital, Andalusia, Alabama
Baptist Memorial Hospital, Gadsden, Alabama
Cobb Memorial Hospital, Phenix City, Alabama
Community Hospital, East Tallassee, Alabama
Doctors Hospital, Mobile, Alabama
Edge Memorial Hospital, Troy, Alabama

Mobile General Hospital, Mobile, Alabama
Randolph County Hospital, Roanoke, Alabama
St. Margaret's Hospital, Montgomery, Alabama
South Highlands Hospital, Birmingham, Alabama
Central State Hospital, Milledgeville, Georgia
E. A. Conway Hospital, Monroe, Louisiana
Rowan Memorial Hospital, Salisbury, North Carolina
Wayne County Hospital, Goldboro, North Carolina
Bartlett Memorial Hospital, Sapulpa, Oklahoma
Flow Memorial Hospital, Denton, Texas
Providence Memorial Hospital, El Paso, Texas
Wilson N. Jones Hospital, Sherman, Texas
Charleston Area Medical Center, Charleston, West Virginia
Herbert J. Thomas Memorial Hospital, Charleston, West Virginia

West
Bella Vita Towers Nursing Home, Denver, Colorado
Holladay Park Hospital, Portland, Oregon
Physicians and Surgeons Hospital, Portland Oregon
Portland Adventist Hospital, Portland, Oregon
Woodland Park Hospital, Portland, Oregon

APPENDIX 3

U.S. DEPARTMENT OF LABOR • MANPOWER ADMINISTRATION

DESCRIPTIVE RATING SCALE

SCORE _____

RATING SCALE FOR _____

D.O.T. Title and Code

Directions: Please read the "Suggestions to Raters" and then fill in the items which follow. In making your ratings, only one box should be checked for each question.

SUGGESTIONS TO RATERS

We are asking you to rate the job performance of the people who work for you. These ratings will serve as a "yardstick" against which we can compare the test scores in this study. The ratings must give a true picture of each worker or this study will have very little value. You should try to give the most accurate ratings possible for each worker.

These ratings are strictly confidential and won't affect your workers in any way. Neither the ratings nor test scores of any workers will be shown to anybody in your company. We are interested only in "testing the tests." Ratings are needed only for those workers who are in the test study.

Workers who have not completed their training period, or who have not been on the job or under your supervision long enough for you to know how well they can perform this work should not be rated. Please inform the test technician about this if you are asked to rate any such workers.

Complete the last question only if the worker is no longer on the job.

In making ratings, don't let general impressions or some outstanding trait affect your judgment. Try to forget your personal feelings about the worker. Rate only on the work performed. Here are some more points which might help you:

1. Please read all directions and the rating scale thoroughly before rating.

2. For each question compare your workers with "workers-in-general" in this job. That is, compare your workers with other workers on this job that you have known. This is very important in small plants where there are only a few workers. We want the ratings to be based on the same standard in all the plants.

3. A suggested method is to rate all workers on one question at a time. The questions ask about different abilities of the workers. A worker may be good in one ability and poor in another: for example, a very slow worker may be accurate. So rate all workers on the first question, then rate all workers on the second question, and so on.

4. Practice and experience usually improve a worker's skill. However, one worker with six months' experience may be a better worker than another with six years' experience. Don't rate one worker as poorer than another merely because of a lesser amount of experience.

5. Rate the workers according to the work they have done over a period of several weeks or months. Don't rate just on the basis of one "good" day, or one "bad" day or some single incident. Think in terms of each worker's usual or typical performance.

6. Rate only the abilities listed on the rating sheet. Do not let factors such as cooperativeness, ability to get along with others, promptness and honesty influence your ratings. Although these aspects of a worker are important, they are of no value for this study as a "yardstick" against which to compare aptitude test scores.

MA 7-66
Apr. 1973

NAME OF WORKER *(Print)* *(Last)* *(First)*

SEX: MALE_____ FEMALE_____

Company Job Title: _____

How often do you see this worker in a work situation?

- ☐ All the time.
- ☐ Several times a day.
- ☐ Several times a week.
- ☐ Seldom.

How long have you worked with this worker?

- ☐ Under one month.
- ☐ One to two months.
- ☐ Three to five months.
- ☐ Six months or more.

A. How much can this worker get done? (Worker's ability to make efficient use of time and to work at high speed.) (If it is possible to rate only the quantity of work which a person can do on this job as adequate or inadequate, use #2 to indicate "inadequate" and #4 to indicate "adequate.")

- ☐ 1. Capable of very low work output. Can perform only at an unsatisfactory pace.
- ☐ 2. Capable of low work output. Can perform at a slow pace.
- ☐ 3. Capable of fair work output. Can perform at an acceptable pace.
- ☐ 4. Capable of high work output. Can perform at a fast pace.
- ☐ 5. Capable of very high work output. Can perform at an unusually fast pace.

B. How good is the quality of work? (Worker's ability to do high-grade work which meets quality standards.)

- ☐ 1. Performance is inferior and almost never meets minimum quality standards.
- ☐ 2. Performance is usually acceptable but somewhat inferior in quality.
- ☐ 3. Performance is acceptable but usually not superior in quality.
- ☐ 4. Performance is usually superior in quality.
- ☐ 5. Performance is almost always of the highest quality.

C. How accurate is the work? (Worker's ability to avoid making mistakes.)

- ☐ 1. Makes very many mistakes. Work needs constant checking.
- ☐ 2. Makes frequent mistakes. Work needs more checking than is desirable.
- ☐ 3. Makes mistakes occasionally. Work needs only normal checking.
- ☐ 4. Makes few mistakes. Work seldom needs checking.
- ☐ 5. Rarely makes a mistake. Work almost never needs checking.

MA 7-66
Apr. 1973

D. How much does the worker know about the job? (Worker's understanding of the principles, equipment, materials and methods that have to do directly or indirectly with the work.)

- ☐ 1. Has very limited knowledge. Does not know enough to do the job adequately.
- ☐ 2. Has little knowledge. Knows enough to get by.
- ☐ 3. Has moderate amount of knowledge. Knows enough to do fair work.
- ☐ 4. Has broad knowledge. Knows enough to do good work.
- ☐ 5. Has complete knowledge. Knows the job thoroughly.

E. How large a variety of job duties can the worker perform efficiently? (Worker's ability to handle several different operations.)

- ☐ 1. Cannot perform different operations adequately.
- ☐ 2. Can perform a limited number of different operations efficiently.
- ☐ 3. Can perform several different operations with reasonable efficiency.
- ☐ 4. Can perform many different operations efficiently.
- ☐ 5. Can perform an unusually large variety of different operations efficiently.

F. Considering all the factors already rated, and only these factors, how good is this worker? (Worker's all-around ability to do the job.)

- ☐ 1. Performance usually not acceptable.
- ☐ 2. Performance somewhat inferior.
- ☐ 3. A fairly proficient worker.
- ☐ 4. Performance usually superior.
- ☐ 5. An unusually competent worker.

Complete the following ONLY if the worker is no longer on the job.

G. What do you think is the reason this person left the job? (It is not necessary to show the official reason if you feel that there is another reason, as this form will not be shown to anybody in the company.)

- ☐ 1. Fired because of inability to do the job.
- ☐ 2. Quit, and I feel that it was because of difficulty doing the job.
- ☐ 3. Fired or laid off for reasons other than ability to do the job (i.e., absenteeism, reduction in force).
- ☐ 4. Quit, and I feel the reason for quitting was not related to ability to do the job.
- ☐ 5. Quit or was promoted or reassigned because the worker had learned the job well and wanted to advance.

RATED BY	TITLE	DATE
COMPANY OR ORGANIZATION 17	LOCATION (*City, State, ZIP Code*)	

APPENDIX 4

S-270R75

Nurse, Licensed Practical (medical ser.) 079.378

JOB DUTIES

Cares for ill, injured, convalescent and handicapped persons in hospitals, clinics, private homes, sanitariums and similar institutions.

*Provides assistance to patients: Assists patients in dressing, personal hygiene and feeding. Answers patient's signal light or bell, ascertains patient's needs or desires and complies with request if not contradictory to physician's orders. Promotes patient's cooperation, gives information on health habits and maintains comfortable environment for patient. Renders care for promotion of comfort when patient is in an unwieldy and heavy apparatus or appliance. Assists and instructs patient in corrective exercises prescribed by physician.

*Assists physician with examination and/or treatment: Sets up instruments and supply trays, positions special equipment, prepares patient and assists physician with examination and/or treatment. Prepares and applies dressings, compresses and packs. Takes patient's pulse, temperature and blood pressure, recording, when authorized, on the patient's chart. Pours, measures and/or counts out authorized medicine and administers prescribed dosage to patient. Keeps record of patient's solid and fluid intake and output as ordered by physician.

*Aids in surgery or delivery: Sets up equipment in operating and delivery rooms. Hands instruments to surgeon, obstetrician or professional nurse during surgery or delivery. Observes postoperative condition of patient and condition of newborn and reports to professional nurse unfavorable reactions such as bleeding, infection, weak pulse, shallow respiration or sudden reduction in blood pressure. Assists in emergency treatment such as administration of oxygen, glucose, blood or blood plasma to counteract unfavorable reactions.

*Cares for newborn. Feeds newborn or takes to mother for feeding on prescribed schedule. Records type and frequency of feeding and, for bottle feeding, amount of intake. Prepares formula for infants.

Performs housekeeping duties: Prepares, sterilizes, stores and issues instruments, dressings, solutions and supplies. Maintains records of items issued and posts charges against patient or department.

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*These job duties were designated as critical since they must be performed competently if the job is to be performed in a satisfactory manner. Licensed Practical Nurses spend about 90% of their working time performing these duties.